AMENDMENTS TO THE CLAIMS

1. **(Withdrawn)** A method of controlling the damping of a prosthetic knee worn by an amputee, comprising:

storing in a controller of said prosthetic knee a correlation relating sensory data and damping established in clinical investigations of individuals of varying size;

measuring sensory information while said amputee is mobile or stationary and providing said sensory information to said controller; and

adjusting the damping of said prosthetic knee to values derived by said controller using said correlation and said sensory information independently of prior knowledge of said amputee's size.

2. **(Withdrawn)** The method of Claim 1, wherein said correlation characterizes knee behavior during stance phase.

3. **(Withdrawn)** The method of Claim 1, wherein said controller has further stored therein biomechanical information.

4. **(Withdrawn)** The method of Claim 1, wherein measuring sensory information comprises measuring axial force.

5. **(Withdrawn)** The method of Claim 1, wherein measuring sensory information comprises measuring moment.

6. **(Withdrawn)** The method of Claim 1, wherein measuring sensory information comprises measuring knee angle.

7. **(Withdrawn)** The method of Claim 6, wherein said method further comprises differentiating knee angle measurements to calculate angular velocity of said prosthetic knee.

8. **(Withdrawn)** The method of Claim 1, wherein said method further comprises amplifying said sensory information.

9. **(Withdrawn)** The method of Claim 1, wherein said method further comprises monitoring moisture level local to said prosthetic knee.

10. **(Withdrawn)** The method of Claim 1, wherein said method further comprises automatically adjusting stance phase damping suitable for said amputee without requiring patient specific information to be pre-programmed in said prosthetic knee.

11. **(Withdrawn)** A method of controlling the damping of a prosthetic knee worn by an amputee, comprising:

storing in a controller of said prosthetic knee a correlation relating impact force of said amputee's prosthetic leg against an extension stop of said prosthetic knee and damping established in prior clinical investigations of individuals moving at varying speeds;

measuring said impact force as said amputee moves and providing measurements of said impact force to said controller; and

adjusting the damping of said prosthetic knee to values derived by said controller using said correlation and said measurements of said impact force to automatically control damping at substantially all speeds.

12. **(Withdrawn)** The method of Claim 11, wherein said method comprises measuring said impact force using sensors local to said prosthetic knee.

13. **(Withdrawn)** The method of Claim 11, wherein adjusting the damping of said prosthetic knee comprises controlling swing phase damping.

14. **(Withdrawn)** The method of Claim 11, wherein said method further comprises measuring knee angle.

15. **(Withdrawn)** The method of Claim 14, wherein said method further comprises modulating swing extension damping within a predetermined knee angle range.

16. **(Withdrawn)** The method of Claim 14, wherein said method further comprises modulating the knee angle range over which swing phase extension damping is applied.

17. **(Withdrawn)** The method of Claim 11, wherein said method further comprises measuring ground contact time of said amputee's prosthetic foot as said amputee moves at various speeds and said contact time being indicative of said amputee's speed.

18. **(Withdrawn)** The method of Claim 17, wherein said method further comprises storing said contact time within said controller in time slots corresponding to the speed of said amputee.

19. **(Withdrawn)** The method of Claim 18, wherein said method further comprises iteratively modulating the swing flexion damping to achieve a target peak flexion angle range until the swing flexion damping converges within each time slot.

20. **(Withdrawn)** The method of Claim 18, wherein said method further comprises iteratively modulating the swing extension damping to control the impact force of the extending prosthetic leg until swing extension damping converges within each time slot.

21. **(Withdrawn)** A controllable prosthetic knee for use by an amputee, comprising:

a knee actuator for providing controlled and variable knee damping;

one or more sensors for measuring sensory information while said amputee is mobile or stationary;

a controller adapted to communicate commands to said knee actuator and receive input from said sensors;

a memory within said controller and having stored therein a relationship between sensory data and damping established in clinical investigations of individuals of varying size;

whereby, said controller adjusts the damping of said knee actuator to values derived by said controller using said relationship and sensory information from said sensors without requiring patient specific information to be pre-programmed in said prosthetic knee.

22. **(Withdrawn)** The prosthetic knee of Claim 21, wherein said sensory data comprises axial force, moment and knee angle data.

23. **(Withdrawn)** The prosthetic knee of Claim 21, wherein said sensory data comprises impact force data of said amputee's prosthetic leg impacting a knee cap of said prosthetic knee.

24. **(Withdrawn)** The prosthetic knee of Claim 21, wherein said knee actuator comprises a magnetorheological actuator.

25. **(Withdrawn)** The prosthetic knee of Claim 24, wherein said magnetorheological actuator comprises a plurality of spaced plates with magnetorheological fluid therebetween.

26. **(Withdrawn)** The prosthetic knee of Claim 21, wherein said knee actuator comprises a viscous torque actuator.

27. **(Withdrawn)** The prosthetic knee of Claim 21, wherein said knee actuator comprises a pneumatic actuator.

28. **(Withdrawn)** The prosthetic knee of Claim 21, wherein said knee actuator comprises a dry friction actuator.

29. **(Withdrawn)** The prosthetic knee of Claim 21, wherein said memory has further stored therein biomechanical information to guide the modulation of damping.

30. **(Withdrawn)** The prosthetic knee of Claim 21, wherein said memory has further stored therein converged swing phase damping values for automatically controlling swing phase damping at various amputee locomotory speeds.

31. **(Withdrawn)** A method of controlling a prosthetic knee worn by an amputee, comprising:

measuring speed indicative data as said amputee moves at various speeds;

storing said data in a memory of said prosthetic knee in bins corresponding to the speed of said amputee;

iteratively modulating the damping to achieve a predetermined and/or computed target until the damping converges within each bin; and

controlling said prosthetic knee by utilizing the converged damping values to control the damping of said prosthetic knee by varying the viscosity of a magnetorheological fluid contained in said prosthetic knee that provides variable resistance to flexion and/or extension.

32. **(Withdrawn)** The method of Claim 31, wherein measuring speed indicative data comprises measuring ground contact time.

33. **(Withdrawn)** The method of Claim 32, wherein said ground contact time changes substantially monotonically with the speed of said amputee.

34. **(Withdrawn)** The method of Claim 32, wherein said ground contact time is stored in about twenty said bins.

35. **(Withdrawn)** The method of Claim 34, wherein each of said bins has a size that represents about 100 milliseconds.

36. **(Withdrawn)** The method of Claim 31, wherein iteratively modulating the damping comprises iteratively modulating the damping to achieve a target swing flexion angle over a range of speeds of the amputee.

37. **(Withdrawn)** The method of Claim 36, wherein said target swing flexion angle is about 80°.

38. **(Withdrawn)** The method of Claim 31, wherein controlling said prosthetic knee comprises controlling flexion and/or extension of said prosthetic knee over a range of speeds of the amputee.

39. **(Withdrawn)** The method of Claim 31, wherein said method further comprises applying a magnetic field to vary the viscosity of said magnetorheological fluid.

40. **(Withdrawn)** The method of Claim 39, wherein said method further comprises shearing said magnetorheological fluid.

41. **(Withdrawn)** The method of Claim 40, wherein shearing said magnetorheological fluid comprises shearing said magnetorheological fluid in a plurality of gaps.

42. **(Withdrawn)** The method of Claim 40, wherein shearing said magnetorheological fluid comprises shearing said magnetorheological fluid in a plurality of gaps formed between a plurality of blades.

43. **(Withdrawn)** The method of Claim 42, wherein said blades are rotatable.

44. **(Withdrawn)** The method of Claim 43, wherein said blades are in mechanical communication with a lower leg portion.

45. **(Withdrawn)** The method of Claim 43, wherein said blades are in mechanical communication with an upper leg portion.

46. **(Withdrawn)** A method of controlling a prosthetic knee worn by an amputee using a controller which transitions between a plurality of states of biological gait including a first state generally corresponding to stance flexion, a second state generally corresponding to stance extension, a third state generally corresponding to knee break, a fourth state generally corresponding to swing flexion, and a fifth state generally corresponding to swing extension, said method comprising:

measuring sensory information and providing said sensory information to said controller for computation of axial force, extension moment, knee angle and velocity;

transitioning from said first state to said second state under condition C12 and said condition C12 being satisfied when said prosthetic knee achieves a predetermined extension velocity;

transitioning from said second state to said third state under condition C23 and said condition C23 being satisfied when said extension moment is below a first threshold;

transitioning from said third state to said fourth state under condition C34 and said condition C34 being satisfied when said axial force falls below a second threshold;

transitioning from said fourth state to said fifth state under condition C45 and said condition C45 being satisfied when said prosthetic knee begins to extend;

transitioning from said fifth state to said first state under condition C51 and said condition C51 being satisfied when said axial force climbs above a third threshold; and

controlling operation of said prosthetic knee in said states of biological gait by processing said sensory information to provide a controlled and variable resistance to flexion and/or extension.

47. **(Withdrawn)** The method of Claim 46, wherein said condition C23 is further satisfied when said prosthetic knee is at or close to full extension.

48. **(Withdrawn)** The method of Claim 47, wherein said condition C23 is further satisfied when said prosthetic knee has been substantially still for a predetermined time.

49. **(Withdrawn)** The method of Claim 46, wherein said method further comprises transitioning from said first state to said third state under condition C13 and said condition C13 is satisfied when said extension moment is below a fourth threshold.

50. **(Withdrawn)** The method of Claim 49, wherein said condition C13 is further satisfied when said prosthetic knee is at or close to full extension.

51. **(Withdrawn)** The method of Claim 50, wherein said condition C13 is further satisfied when said prosthetic knee has been substantially still for a predetermined time.

52. **(Withdrawn)** The method of Claim 46, wherein said method further comprises transitioning from said first state to said fourth state under condition C14 and said condition C14 is satisfied when said axial force falls below a fourth threshold.

53. **(Withdrawn)** The method of Claim 46, wherein said method further comprises transitioning from said second state to said first state under condition C21 and said condition C21 is satisfied when said prosthetic knee achieves a predetermined flexion velocity.

54. **(Withdrawn)** The method of Claim 46, wherein said method further comprises transitioning from said second state to said fourth state under condition C24 and said condition C24 is satisfied when said axial force falls below a fourth threshold

55. **(Withdrawn)** The method of Claim 46, wherein said method further comprises transitioning from said third state to said first state under condition C31 and said condition C31 is satisfied when said prosthetic knee has been in said third state for a predetermined time.

56. **(Withdrawn)** The method of Claim 46, wherein said method further comprises transitioning from said third state to said first state under condition C31 and said condition C31 is satisfied when extension moment is above a fourth threshold.

57. **(Withdrawn)** The method of Claim 56, wherein said condition C31 is further satisfied when said prosthetic knee is at or close to full extension.

58. **(Withdrawn)** The method of Claim 46, wherein said method further comprises transitioning from said fourth state to said first state under condition C41 and said condition C41 is satisfied when said axial force climbs above a fourth threshold.

59. **(Currently amended)** A method of controlling a prosthetic knee system, comprising:

measuring at least one characteristic of knee movement;

identifying a control state based at least partly on the at least one measured characteristic of knee movement;

calculating a damping value based at least partly on the control state; and

applying the damping value to control ~~the~~ resistance of a magnetorheological damper operating in shear mode.

60. **(Previously presented)** The method of Claim 59, wherein the magnetorheological damper operating in shear mode comprises a rotary magnetorheological damper operating in shear mode.

61. **(Previously presented)** The method of Claim 59, wherein the measuring comprises receiving a value from a knee angle sensor.

62. **(Previously presented)** The method of Claim 59, wherein the measuring comprises receiving a value from a load sensor.

63. **(Previously presented)** The method of Claim 62, wherein receiving a value from the load sensor comprises receiving at least one value from a strain gauge.

64. **(Previously presented)** The method of Claim 59, wherein the calculating comprises adapting a damping parameter.

65. **(Previously presented)** A prosthetic knee system, comprising:

a magnetorheological damper operating in shear mode;

at least one sensor configured to measure knee motion;

a software system configured to identify a control state based at least partly on the measure of knee motion and configured to send a control signal to the damper based at least partly on the control state.

66. **(Previously presented)** The system of Claim 65, wherein the magnetorheological damper comprises a rotary magnetorheological damper.

67. **(Previously presented)** The system of Claim 65, wherein the at least one sensor comprises a knee angle sensor.

68. **(Previously presented)** The system of Claim 65, wherein the at least one sensor comprises a load sensor.

69. **(Previously presented)** The system of Claim 68, wherein the load sensor comprises at least one strain gauge.

70. **(Previously presented)** The system of Claim 65, wherein the control signal comprises a current and wherein the damper is configured to vary resistance to rotation in response to the current.